

# SIKKIM



## GOVERNMENT

## GAZETTE

**EXTRAORDINARY  
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**GOVERNMENT OF SIKKIM  
DEPARTMENT OF MINES, MINERALS AND GEOLOGY  
GANGTOK – 737101**

**No. 17/DMG/20-21**

**Date:- 19.03.2021**

### NOTIFICATION

In continuation with notification no. GOS/UD&HD/6(294)2001/A dated 15.10.2001 and gazette no. 387 dated 15/10/2001 which notified that the maximum height of buildings constructed in allotted sites or private holdings within a notified area shall be in accordance with the suitability and profile of the locations based on the stability map of the area as prepared by Mines and Geology Department from time to time which shall be as follows:

<b>Stability Zone</b>	<b>Admissible no. of floors</b>
1.	5 ½ storeys
2.	4 ½ storeys
3.	3 ½ storeys
4.	2 ½ storeys
5.	1 ½ storeys
6.	No construction is allowed

The department of Mines and Geology hereby notifies the parameters for determination of stability zones of each zone as follows. These parameters are known as site stability zonation parameters and will be strictly followed during categorization of zones:

#### **Zone 1**

<b>Rock Properties:</b>	Bed rock/parent soil is expected at foundation depth. Unweathered/ surfacial weathering, compact with no joint spacing, moderate to high compressive strength, high frictional resistance.
<b>Built up area:</b>	Training of jhoras/drains have been completed and done properly (with safe distance)
<b>Overburden:</b>	Thin to medium thick having good bearing capacity of soil.
<b>Bearing Capacity:</b>	> 35 T/m <sup>2</sup>
<b>Ground Water</b>	
<b>Activity:</b>	Low
<b>Relation Between Natural Slope And</b>	

**Rock Bed/Foliation:** Favourable,  $>30^\circ$   
**Adverse Geo-Environment:** Nil  
**Upslope pressure:** Nil  
**Vibration Impact:** Minimum  
**Slope:** Gentle to moderate.  $<15^\circ$   
**Depth of soil:**  $<3\text{m}$   
**Relative relief:**  $<100\text{m}$   
**Hydrological conditions:** Dry/nil  
**Category:** Suitable after taking appropriate measures to slope/precautionary and preventive measures at the time of foundation levelling.

## Zone 2

**Rock Properties:** Bed rock/parent soil is not expected at foundation level. weathering on surface of contact zone is suspected, medium to high compressive strength, jointed rocks with minimum spacing, joint plane undulating with high frictional resistance.  
**Built up area:** Training jhora/drain was done but not properly maintained.  
**Overburden:** Medium thick (rock expected at considerable depth)  
**Bearing Capacity:**  $15\text{-}35\text{ T/m}^2$   
**Ground Water Activity:** Low to medium  
**Relation Between Natural Slope And Rock Bed/Foliation:** Favourable,  $20\text{-}30^\circ$   
**Adverse Geo-Environment:** Nil.  
**Upslope pressure:** Suspected  
**Slope:** Gentle to moderate,  $16\text{-}25^\circ$   
**Upslope pressure:** Nil  
**Vibration Impact:** Minimum  
**Depth of soil:**  $3\text{-}8\text{ metres}$   
**Relative relief:**  $101\text{-}300\text{ metres}$   
**Hydrological conditions:** Damp  
**Category:** Suitable after taking proper surface/sub-surface drainage system.

## Zone 3

**Rock Properties:** Bed rock/parent soil is not expected at foundation level. Weathering on surface of contact zone is suspected, low to medium compressive strength, jointed rocks with minimum spacing, and joint plane smooth with low frictional resistance.  
**Built-up area:** Jhora training is required/annual maintenance of drain is necessary.  
**Overburden:** Thick soil overburden, having moderate to low soil bearing capacity.  
**Bearing capacity:**  $<15\text{ T/m}^2$   
**Ground Water Activity:** Medium to high  
**Relation Between Natural Slope And**

<b>Rock Bed/Foliation:</b>	Rock dips at some angle to direction of slope, <20°
<b>Adverse Geo-Environment:</b>	Rocks are subjected to folding, fracturing & weathering.
<b>Slope:</b>	Moderate to high. slope which reflects the competency of slope forming materials 26-35°
<b>Upslope pressure:</b>	Suspected.
<b>Vibration Impact:</b>	Low to medium
<b>Depth of soil:</b>	>8m
<b>Relative relief:</b>	>300m
<b>Hydrological conditions:</b>	Wet
<b>Category:</b>	Suitable after taking various geotechnical corrective measures.
<b>Zone 4</b>	
<b>Rock Properties:</b>	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
<b>Built up area:</b>	Untrained jhora/ erosional potential jhora
<b>Overburden:</b>	Medium thick to thick soil overburden
<b>Bearing capacity:</b>	<10 T/m <sup>2</sup>
<b>Ground Water Activity:</b>	Higher water regime.
<b>Relation Between Natural Slope And Rock Bed/Foliation:</b>	Slightly adverse to adverse.
<b>Adverse Geo-Environment:</b>	Gully erosion & collapse of jhora facing slopes at isolated places, formation of cracks or fissures on the ground. Creep movement suspected.
<b>Slope:</b>	Steep, 36-45°
<b>Upslope pressure:</b>	Suspected.
<b>Vibration Impact:</b>	Low to medium
<b>Depth of soil:</b>	>8m
<b>Relative relief:</b>	>300m
<b>Hydrological conditions:</b>	Dripping
<b>Category:</b>	Not suitable for habitation unless immediate protective measures to safeguard upslope/ minimise further degradation of stability condition of upslope area.
<b>Zone 5</b>	
<b>Rock Type:</b>	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
<b>Built up area:</b>	Nil
<b>Overburden:</b>	Thick with low soil bearing capacity.
<b>Bearing capacity:</b>	<10 T/m <sup>2</sup>
<b>Ground Water Activity:</b>	High.
<b>Relation Between Natural Slope And</b>	

<b>Rock Bed/Foliation</b>	Slightly adverse to adverse.
<b>Adverse Geo-Environment:</b>	Area subjected to isolated slope failure, creep movement widespread, wide cracks on ground.
<b>Slope:</b>	high to steep slope, $>45^\circ$
<b>Upslope pressure:</b>	Present.
<b>Vibration Impact:</b>	Medium
<b>Depth of soil:</b>	$>10\text{m}$
<b>Relative relief:</b>	$>300\text{m}$
<b>Hydrological conditions:</b>	Flowing
<b>Category:</b>	Area not suitable needs immediate protective measures to protect upslope area.
<b>Zone 6</b>	
<b>Rock Type:</b>	Bed rock/parent soil is beyond foundation level. high degree of weathering is suspected, very low compressive strength, jointed rocks, joint plane smooth with low frictional resistance
<b>Built up area:</b>	Nil
<b>Overburden:</b>	Thick with low soil bearing capacity.
<b>Bearing Capacity:</b>	$<5 \text{ T/m}^2$
<b>Ground Water Activity:</b>	High.
<b>Relation Between Natural Slope And Rock Bed/Foliation:</b>	Adverse.
<b>Adverse Geo-Environment:</b>	Incidences of slope failure, gully erosion, adverse slope facing towards jhora section etc.
<b>Slope:</b>	High slope $>45^\circ$
<b>Upslope pressure:</b>	Present.
<b>Vibration Impact:</b>	medium
<b>Depth of soil:</b>	$>10\text{m}$
<b>Relative relief:</b>	$>300\text{m}$
<b>Hydrological conditions:</b>	Flowing
<b>Category:</b>	Area not suitable needs immediate protection for arresting further aggravation of instability problems.

Further, the department will be reviewing the zonation ratings on the following conditions.

**Conditions and pre-requisite for review of site stability report/up-gradation of Land Stability Zonation for particular site.**

1. Recommendation suggested in site stability report should be adopted during construction of structures.
2. Training of untrained Jhora and maintenance at regular intervals which is located adjacent to the plot.
3. Construction of structure below the building which was barren before which also aids in improving the stability of the upslope area. Further, construction of building in the downslope area also acts a retaining/protective wall for the houses located in the upslope area.

4. Minimum of three (03) years after the completion of house construction so as to observe the incidences of differential settlement as per the IS Code of Practice for calculation of settlements of foundations (IS Code:- 8009(Part 1)-1978(Reaffirmed 2003)). The review of the rating on zonation can be done.
5. Proper channelization of surface runoff by providing catchment drains especially during the rainy seasons and connect it to natural waterways/Jhora which also improves the stability of the area due to reduced erosions and percolation of water in the slope concerned.
6. Any site improvement activities/works like grouting/micro-pilling/retaining works/rock bolting/anchoring/shot creting works as per site requirement has been done in the area which will re-strengthen the stability condition shall be entertained for review of stability zonation rating.

**B.P Pradhan, IFS**  
**Secretary**

